

**I claim:**

1. A dual frequency band inverted-F antenna for transmitting and receiving a low frequency signal and a high frequency  
5 signal, comprising :  
    a substrate ;  
    a ground metal, which is formed on a lower surface of said substrate ;  
    a vortical metal structure, which is formed on an upper  
10 surface of said substrate, further having a short circuit end and an open circuit end wherein said open circuit end is located within a center of said vortical metal structure ;  
    a short circuit leg, which connects electrically said short  
15 circuit end of said vortical metal structure with said ground metal ; and  
    a feeding leg, which extends along a predetermined direction of said vortical metal structure to couple with a feeding circuit on said substrate ;  
    wherein, by increasing an encircling number of said vortical  
20 metal structure to generate a coupling effect so as to make an equivalent wavelength of said high frequency signal longer and thus to reduce a resonance frequency thereof, a first frequency is still kept communicating at a lower frequency band and a second frequency is added for communicating at a higher  
25 frequency band.
2. The dual frequency band inverted-F antenna of claim 1, further comprising a terminal micro strip which is fabricated on the lower surface of said substrate and connected electrically to  
30 said open circuit end through a first conductive aperture.
3. The dual frequency band inverted-F antenna of claim 2, wherein said terminal micro strip has a function of adjusting a coupled impedance with said feeding circuit.
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4. The dual frequency band inverted-F antenna of claim 1, wherein said ground metal connects electrically to said short circuit leg through a conductive aperture.

5. The dual frequency band inverted-F antenna of claim 1,  
wherein said ground metal, said vortical metal structure,  
said short circuit leg and said feeding leg are printed  
5 circuits located on said substrate.
6. The dual frequency band inverted-F antenna of claim 1,  
wherein the equivalent current path length of said open  
circuit end and said short circuit end is one quarter of a  
10 selected wavelength so as to form an open circuit-short  
circuit structure.
7. The dual frequency band inverted-F antenna of claim 1,  
wherein said vortical metal structure generates inductance to  
15 form internal impedance and thus increases freedom of  
adjusting input impedance of said dual frequency band  
inverted-F antenna.
8. A dual frequency band inverted-F antenna for  
20 communicating a low frequency signal and a high frequency  
signal, comprising :  
a substrate ;  
a ground metal, which is formed on a lower surface of said  
substrate ;  
25 a vortical metal structure, which is formed on an upper  
surface of said substrate, further having a short circuit end and  
an open circuit end wherein said open circuit end is located  
within a center of said vortical metal structure ;  
a short circuit leg, which connects electrically said short  
30 circuit end of said vortical metal structure with said ground  
metal ;  
a feeding leg, which extends along a predetermined direction  
of said vortical metal structure to couple with a feeding circuit  
on said substrate ; and

a terminal micro strip, which is fabricated on the lower surface of said substrate and connected electrically to said open circuit end through a first conductive aperture ;

wherein, by increasing an encircling number of said vortical  
5 metal structure to generate a coupling effect so that an equivalent wavelength of said high frequency signal becomes longer and thereby a resonance frequency thereof is reduced, a first frequency is still kept communicating at a lower frequency band and a second frequency is added for communicating at a  
10 higher frequency band.

9. The dual frequency band inverted-F antenna of claim 8, wherein said ground metal connects electrically to said short circuit leg through a second conductive aperture.

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10. The dual frequency band inverted-F antenna of claim 8, wherein said terminal micro strip has a function of adjusting a coupled impedance with said feeding circuit.

20 11. The dual frequency band inverted-F antenna of claim 8, wherein said ground metal, said vortical metal structure, said short circuit leg, said feeding leg, and said terminal micro strip are printed circuits located on said substrate.

25 12. The dual frequency band inverted-F antenna of claim 8, wherein the equivalent current path length of said open circuit end and said short circuit end is one quarter of a selected wavelength so as to form an open circuit-short circuit structure.

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13. The dual frequency band inverted-F antenna of claim 8,  
wherein said vortical metal structure generates inductance to  
form internal impedance and thus increases freedom of  
adjusting input impedance of said dual frequency band  
inverted-F antenna.